



LBL-group meeting

neutrino.lbl.gov/~snoman/currat/talks/

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March 30, 2004

❖ Muons on NCDs



Muon tracking

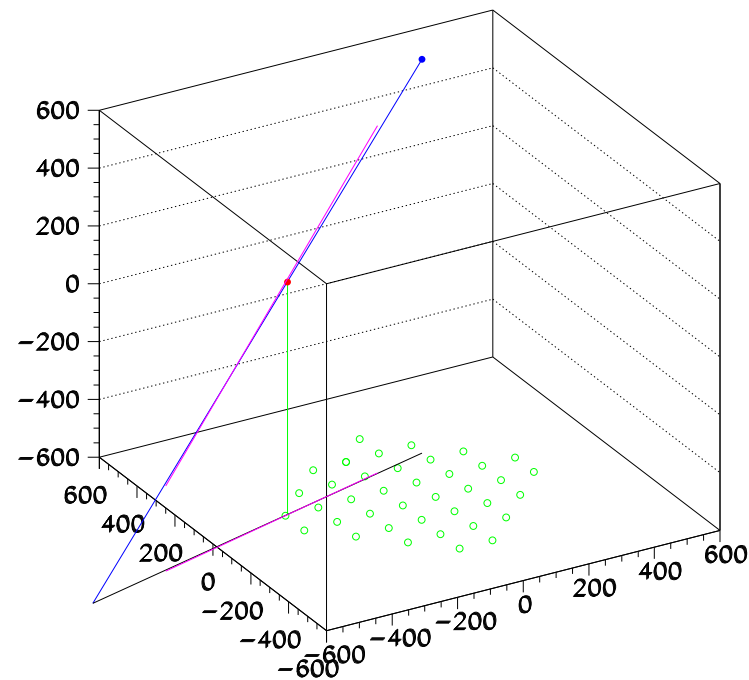
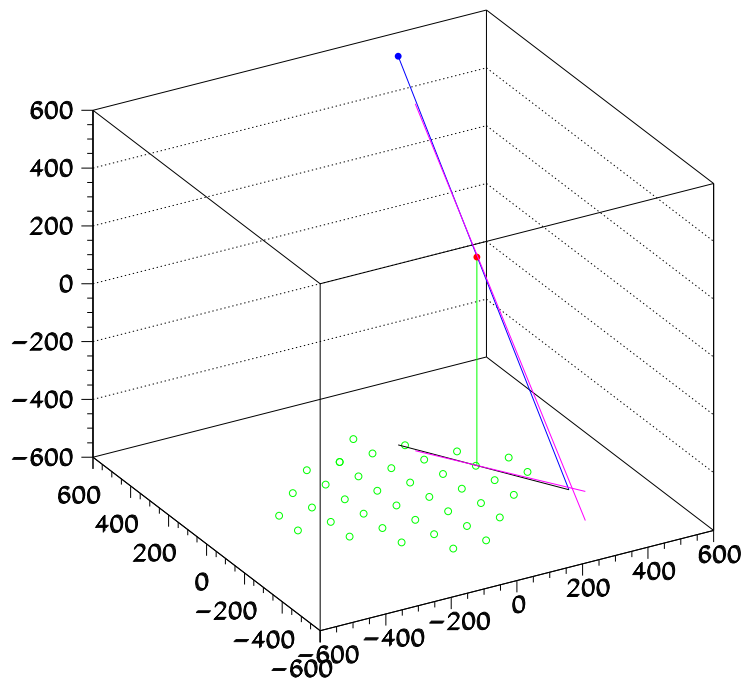
We need a golden sample of muons to tune the MC and the fitter on a separate basis (incestuous relationship to data so far)

- ❖ tracking chambers: most efficient. Still waiting for people's feedback. Definitely realistic with moderate effort (CDF, Northwestern/ATLAS, Greece)
- ❖ **meantime**: NCDs being commissioned. Is there any way we could take advantage of them in the muon study? Yes/No → answer is not immediate. To be clarified

☞ Reminder: 72 muons/day within PSUP cross section (250 m^2). Typical tracker of $\sim 9 \text{ m}^2$ would get 2.6 muons/day.

NCDs

- ❖ On the back of the envelope, we have: 40 NCD strings about 9m long, 2 inch in diameter \Rightarrow total lateral apparent surface area *assuming independent strings*
 $40 \times 5 \text{ cm} \times 1000 \text{ cm} = 20 \times 10^4 \text{ cm}^2$.
 Average zenith angle of cosmics $\langle \cos \theta \rangle \simeq 0.89$ ($\langle \theta \rangle \simeq 0.47$) \Rightarrow effective area
 $20 \times \sin(0.47) \simeq 9 \text{ m}^2$ (coincidental)
- ❖ Generated 25 days worth of cosmics (blue), with reporting of tracking vertices inside active NCD volume (red), and fitter results (magenta)

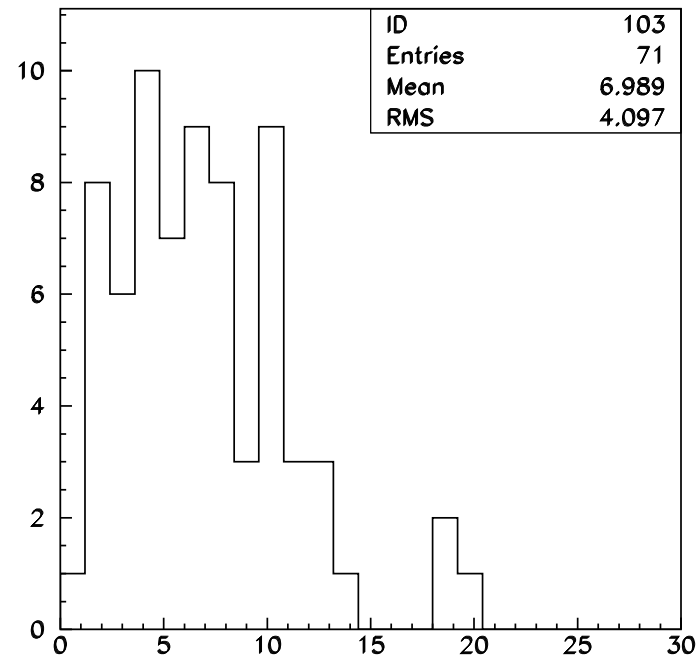
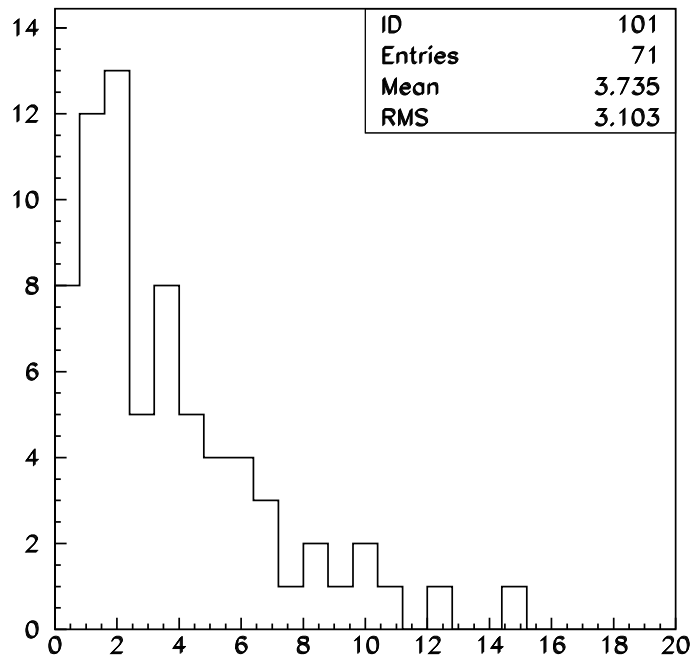




Does NCD info help?

NCD will hardly provide any information on position along the string "Z".
Resolution of the order of 5cm in XY.

- ❖ Bookkeeping: out of 1800 events, 1 NCD hit vs 2 vs 3 strings: 71/5/1 (25d)
⇒ 2.84 ± 0.34 muons/day
- ❖ Let's get the impact parameter of the NCD hit w/r to the fitted track, both projection and 3D



➡ Not obvious that the NCD information can significantly help the fitter. Better to invest time & effort in the tracker project.